WHAT IS CLAIMED IS:

1.   A crossbar for providing connections between a plurality
of ports and a plurality of system agents via a processing system comprising:

a plurality of ports, each port capable of being an input port
customized for receiving data from a source agent and an output port
customized for transferring data to a destination agent; and,

crossbar control data for specifying crossbar control information
for transferring data from an input port to an output port having different port
configurations.

2.   The crossbar according to claim 1 wherein the data
received on the input port further comprises control data for indicating validity
and destination information relating to data received on the input port.

3.   The crossbar according to claim 1 further comprising at
least one register on each input port and each said output port for storing data
in memory.

4.   The crossbar according to claim 1 further comprising at
least one shift register on each input port for storing data in memory and
shifting data with larger bit length to a smaller bit length data for transmission
from an input port with more width to an output port with less width.

5.   The crossbar according to claim 1 further comprising at
least one multiplexor device on each said input port and each said output port
for prioritizing transmissions of data.

6.   The crossbar according to claim 1 wherein an input port
and an output port of at least one of said plurality of ports are customized to
have different widths.

1   7.   The crossbar according to claim 1 wherein a plurality of

2 said input ports are customized to have different width.

1   8.   The crossbar according to claim 1 wherein a plurality of

2 said output ports are customized to have different width.

1   9.   The crossbar according to claim 1 wherein said crossbar

2 control data contain control information for formatting bit length of data from

3 an input port to be transmitted to an output port with less width than the input

4 port.

1   10.   The crossbar according to claim 1 wherein said crossbar

2 control data contain control information for use by any one from the group of a

3 shift register or a multiplexor device.

1   11.   A crossbar having a plurality of paths for providing

2 connections between a plurality of ports and a plurality of system agents via a

3 processing system comprising:

4   a plurality of ports, each port capable of being an input port

5 customized for receiving data from a source agent and an output port

6 customized for transferring data to a destination agent;

7   a plurality of virtual communication channels on each input port;

8 and,

9   crossbar control data for specifying crossbar control information

10 for transferring data from a virtual communication channel to an output port

11 having different configurations.

1   12.   A method for transmitting data between customized ports

2 and a plurality of system agents in a processing system via a crossbar, wherein

3 the crossbar includes a plurality of ports, each port capable of being an input

4 port customized for receiving data from a source agent and an output port

5 customized for transferring data to a destination agent, and crossbar control

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6   data for specifying crossbar control information for transmitting data from an

7   input port to an output port having different port configurations, the method

8   comprising the steps of:

9   receiving data on an input port;

10   obtaining the destination output port for the data received on the

11   input port;

12   determining whether the input port has the same configuration as

13   the output port;

14   obtaining control information from the crossbar control data

15   when the input port does not have the same configurations as the output port;

16   processing the data according to the obtained control information

17   from the crossbar control data; and,

18   transmitting the processed data to the destination output port.

1   13.   The method according to claim 12 wherein said step of

2   receiving data further comprises the steps of:

3   reading control data received with the data on the input port;

4   determining whether the control data have valid port information;

5   and,

6   aborting when the control data does not have valid port

7   information.

1   14.   The method according to claim 13 wherein said step of

2   obtaining the destination output port further comprises the step of obtaining the

3   destination output port from the control data when the control data has valid

4   port information.

1   15.   The method according to claim 12 wherein said step of

2   processing the data further comprising the steps of:

3   determining whether the width of the input port is more than the

4 width of the output port;

5   submitting the data as the processed data when the width of the

6 input port is not more than the width of the output port;

7   obtaining the width of the output port when the width of the input

8 port is greater than the width of the output port;

9   formatting the data from the input port to data configured for the

10 obtained width of the output port; and,

11   submitting the formatted data as the processed data.

1   16.   A system for transmitting data between customized ports

2 and a plurality of system agents in a processing system via a crossbar, wherein

3 the crossbar includes a plurality of ports, each port capable of being an input

4 port customized for receiving data from a source agent and an output port

5 customized for transferring data to a destination agent, and crossbar control

6 data for indicating crossbar control information for transmitting data from an

7 input port to an output port having different port configurations, comprising:

8   a storage medium;

9   a machine for transmitting data between customized ports and a

10 plurality of system agents in a processing system via a crossbar, the machine

11 comprising a set of instructions for:

12   receiving data on an input port;

13   obtaining the destination output port for the data received on the

14 input port;

15   determining whether the input port has the same configuration as

16 the output port;

17   obtaining control information from the crossbar control data

18 when the input port does not have the same configurations as the output port;

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19   processing the data according to the obtained control information

20   from the crossbar control data; and,

21   transmitting the processed data to the destination output port.

1   17.   A machine for transmitting data between customized ports

2   and a plurality of system agents in a processing system via a crossbar, the

3   machine comprising a set of instructions to::

4   receive data on an input port;

5   obtain the destination output port for the data received on the

6   input port;

7   determine whether the input port has the same configuration as

8   the output port;

9   obtain control information from the crossbar control data when

10   the input port does not have the same configurations as the output port;

11   process the data according to the obtained control information

12   from the crossbar control data; and,

13   transmit the processed data to the destination output port.